DOCUMENT RESUME

ED 307 144 SE 050 600

TITLE	International Strategy for Action in the Field of Environmental Education and Training for the 1990s.
INSTITUTION	United Nations Educational, Scientific, and Cultural Organization, Paris (France).; United Nations Environment Programme, Nairobi (Kenya).
PUB DATE	88
NOTE	26p.; Maps, drawings, and shaded areas may not reproduce well.
AVAILABLE FROM	UNESCO, 7 place de Fontenoy, 75700 Paris, France.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Developing Nations; *Environmental Education; *Global Approach; Higher Education; *International Cooperation; International Educational Exchange; *International Organizations; *International Programs; Natural Resources; Teacher Education

ABSTRACT

This document is the result of discussion, additions, amendments, and approval of a working document submitted for this purpose to the Unesco-UNEP (United Nations Environment Programme) International Congress on Environmental Education and Training (Moscow, USSR, August 1987). Part 1 seeks to highlight certain needs and priorities in respect to the development of environmental education and training as they emerge from the action taken in this field since the Intergovernmental Conference on Environmental Education (Tbilisi, USSR, 1977). Part 2 outlines an international strategy for action in the field of environmental education and training for the 1990s. The third chapter, which is the main part of the document, indicates specific international action in this field. The last chapter is structured around nine sections, each corresponding to an important aspect of environmental education and training or to particular forms or types of education and training considered in this context: access to information; research and experimentation; programs of study and teaching materials; training of personnel; technical and vocational education; educating and informing the public; general university education; specialist training; and international and regional co-operation. (CW)

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ED307144

UNESCO-UNEP CONGRESS ENVIRONMENTAL EDUCATION AND TRAINING

МОСКВА 1987

International Strategy for Action in the field of Environmental Education and Training for the 1990s

SE 050 600

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Introduction

This document was prepared by the Secretariat of Unesco in collaboration with the Secretariat of the United Nations Environment Programme (UNEP). In this final form it is the result of discussion, additions, amendment and approval of a working document submitted for this purpose to the Unesco-UNEP International Congress on Environmental Education and Training, held in Moscow, USSR, 17-21 August 1987, and attended by over 300 specialists from 100 countries plus observers from IUCN and other international organizations.

The document is in two parts. PART ONE seeks to highlight certain needs and priorities in respect to the development of environmental education and training as they emerge from the action taken in this field since the Intergovernmental Conference on Environmental Education (Tbilisi, USSR, 1977) and describe the main aspects of the action taken by Unesco and UNEP since then. The information used in Part One of this document, together with certain ideas and suggestions it contains, is based on international studies and surveys, pilot projects and research carried out, and the conclusions of national, regional and international meetings held, since 1975, within the framework of the International Environmental Education Programme (IEEP). It is also derived from various consultations of Member States and governmental and non-governmental organizations carried out by Unesco and UNEP in connection with their programming activities.

PART TWO outlines an international strategy for action in the field of environmental education and training for the 1990s. This second part contains three chapters, the first of which proposes a summary of the main present-day environmental problems and sketches out the aims of an international strategy for action in this field. The second chapter presents an overview of the essential principles and characteristics of environmental education and training that were taken into account in framing the strategy. The third chapter, which is the main part of the document, indicates specific international action in this field.

This last chapter is structured around nine sections, each corresponding to an important aspect of environmental education and training or to particular forms or types of education and training considered in this context: access to information, research and experimentation, programmes of study and teaching materials, training of personnel, technical and vocational education, educating and informing the public, general university education, specialist training and international and regional co-operation. Each section first recalls the guidelines for the strategy as they emerge from the recommendations of the Tbilisi Conference and changes that have occured in the area considered over the past ten years; it then highlights objectives with a view to meeting needs for the development of environmental education and training in coming years; and lastly, it indicates a series of specific actions that might be of assistance in attaining these objectives.

International action in the field of environmental education and training since the Tbilisi Conference

"It is recommended that the Secretary-General, the organizations of the United Nations system, especially the United Nations Educational, Scientific and Cultural Organization, and the other international agencies concerned, should, after consultation and agreement, take the necessary steps to establish an international programme in environmental education, interdisciplinary in approach, in school and out of school, encompassing all levels of education and directed towards the general public, in particular the ordinary citizen living in rural and urban areas, youth and adult alike, with a view to educating him as to the simple steps he might take, within his means, to manage and control his environment."

(United Nations Conference on the Human Environment, Stockholm, 1972)

1. In 1975, in pursuance of the above recommendation of the United Nations Conference on the Human Environment (Stockholm, 1972) Unesco and the United Nations Environmental Programme (UNEP) launched the International Environmental Education Programme (IEEP). In 1977 the Intergovernmental Conference on Environmental Education (Tbilisi, USSR), considering that there was a sharply felt need in all countries for international co-operation in this field, called upon Unesco and UNEP to continue their efforts to further the development of this education within the international community.

2. Environmental education (EE) is included among the objectives of Unesco's Medium-Term Plan for 1977-1982, which was approved by the Unesco General Conference at its nineteenth session (Nairobi, 1976). In accordance with the recommendations of the Tbilisi Conference, EE activities were included in the programmes and budgets approved by the Unesco General Conference at its twentieth (Paris, 1978), twenty-first (Belgrade, 1980), twenty-second (Paris, 1983), and twenty-third (Sofia, 1985) sessions. At present, environmental education is an integral part of Unesco's second Medium-Term Plan for 1984-1989, within the framework of the Organisation's environmental activities grouped together in Major Programme X, 'The human environment and terrestrial and marine resources'. Similarly, since 1977 all UNEP's programme budgets have included environmental education and training as one of the main components of its programme-supporting activities.

3. The Declaration and Recommendations of the Tbilisi Conference made it possible to define the nature, objectives and pedagogical principles of environmental education and to establish broad guidelines for action in this field at the national and international levels. Since the Tbilisi Conference, the environment has been seen as a whole, simultaneously comprising natural aspects and those that result from human action; EE is viewed as a dimension of the subject-matter and practice of education directed towards the solution of practical environmental problems through an interdisciplinary approach and the active and responsible involvement of each individual and of the community.

4. The Tbilisi Conference considered that EE should be made an integral part of the entire educational process and aimed at every category of the population: (i) the general public and non-specialists; (ii) socio-occupational categories whose activities have a significant impact on the environment; (iii) scientists and technicians whose fields, whether in the natural or the social sciences concern the environment and who need to receive specialized training.

5. With regard to the first category the results of action taken under the Unesco-UNEP International Environmental Education Programme (IEEP) may be appreciated in three complementary areas. First, this action has contributed to widespread **awareness** of the need for environmental education. The first steps to promote such awareness were taken in the early days of IEEP in 1975. It was also of assistance in the **formulation of concepts and the working out of methodological approaches** in this field, which was the main task during the period 1978-1980. Lastly, it facilitated the **incorporation of an environmental dimension into the educational processes of Member States.** Such are the three main permanent functions of this Programme. (Detailed information concerning IEEP action during the period 1975-1986 will be found in the reference document entitled Unesco-UNEP International Environmental Education Programme (1975-1987).

6. Among the IEEP activities that have contributed most to international **awareness** of environmental education, mention should be made of a series of international and regional meetings which culminated in the intergovernmental conference at Tbilisi.

7. A policy of regularly supplying information has also done much to develop international awareness concerning environmental education. The IEEP newsletter **Connect,** which is published in five languages (Arabic, English, French, Russian and Spanish), has some 13,000 individual and institutional subscribers in the five regions of the world actively involved in the promotion and development of environmental education and training. Mention should also be made of the Unesco journal 'Nature and Resources' which publishes scientific articles and information concerning environmental management and the rational use and conservation of natural resources. It appears every three months in five languages (English, Chinese, French, Russian and Spanish) and has a circulation of 23,500. It aims to help inform specialists and the public at large about environmental problems and, in particular, about the activities carried out by Unesco within the framework of the Man and the Biosphere Programme (MAB), the International

Hydrological Programme (IHP), the International Geological Correlation Programme (IGCP) and the programmes relating to the marine sciences.

8. Mention should also be made in this connection of the development, in the context of IEEP, of a computerized information system in the field of environmental education. This system consists of a set of six data bases which are regularly updated. The system is managed by the **CDS/ISIS** software developed by Unesco and considered to be a model for the management of data bases within the United Nations system. The data bases existing at present concern: (i) individuals active in the field of EE (some 10,000 persons belonging to 162 countries); (ii) institutions chosen by virtue of their activities in respect of EE (to date, 650 institutions established in more than 70 countries throughout the world); (iii) projects, programmes and activities in the field of EE (more than 300 registers); (iv) an annotated bibliography of works relating to EE, in English and French (320 titles); (v) a bibliography of periodicals concerning the field of EE, in English, French and Spanish (200 titles); (vi) the articles published in **Connect** over the past two years. The UNESCO information system provides also access to all the publications (books, documents, reports of meetings, etc.,) prepared by Unesco in the context of its intergovernmental scientific programmes relating to the environment (MAB, IHP, IGCP) and its other fields of competence. Within the framework of its future activities, IEEP is planning gradually to provide remote access to the information system in question so as to place its potential at the disposal of all interested parties.

9. Another important aspect of progress in environmental education at the international, regional and national levels has been the **development of the concepts that characterize it and of its own methodology.** Since 1977, and following on from the Tbilisi Conference, a vast effort has been made both internationally and nationally to arrive at a more precise definition of the content of environmental education and of the methods by which to promote its development. IEEP's contribution has taken the form in particular of studies and the organization of seminars, research and experimental projects, as a result of which it has been made clear that environmental education should be a dimension of all subjects and areas of education taking into account both the social and the natural aspects of the human environment. Emphasis has therefore been placed on the interdisciplinary nature of environmental education, and also on the need to reach all categories of the population through in-school and out-of-school education.

10. IEEP action has also contributed to efforts to introduce an environmental dimension into the educational practices of Member States. For example, inter-institutional committees have been set up by countries in all regions in the wake of regional conferences and national training courses or pilot projects undertaken or supported within the framework of IEEP in order to foster the incorporation of general environmental education into education systems, both in and out of school.

11. There have been two particularly important aspects to IEEP's contribution, namely, the development of education content, methods and materials and training of educational personnel.

12. With regard to **training of** educational personnel a series of international, regional and subregional training seminars designed to foster greater awareness of the issue among educational administrators, teacher educators and curriculum developers has been organized since 1979. These seminars have dealt notably with the formulation of national environmental education policies, methods of pre- and in-service teacher training, and guidelines for the preparation of educational materials. Teacher-training courses and pilot projects designed to train personnel in the environmental field have also been organized at the national level, within the framework or with the support of IEEP.

13. As regards the development of **content, methods and materials for environmental education,** IEEP has conducted a series of research activities, culminating in the production of a coherent body of teaching materials, comprising methodological guides, thematic modules and textbooks for use in general education and in pre- and in-service teacher training. This material has been published in Arabic, English, French and Spanish, in the "Environmental Education" series, which comprises to date more than 25 titles. It is also worth mentioning, in this context, the series of posters and slides, entitled "Ecology in Action", which has been produced in more than ten languages under the MAB programme. Lastly, pilot projects carried out within the framework of IEEP in numerous countries have served not only to mobilize the national institutions concerned with environmental education, but also to train groups of educators at the national level and to develop educational content and materials suited to local conditions.

14. In addition to its role as a catalyst in the development of environmental education at the national level, IEEP also has a **multiplier effect at the international level.** From its inception, IEEP sought to establish co-operative relations with the institutions of the United Nations system, and also with other intergovernmental and non-governmental organizations involved in environmental education. Formal and informal meetings have been held for this purpose. Today, a growing number of international, regional and subregional organizations have made environmental education a major component of their programmes of action.

15. As far as the **training of environmental specialists** is concerned, major activities have been carried out by various international organizations, in particular Unesco and UNEP. Unesco has mainly acted through its international scientific programmes relating to the human environment and terrestrial and marine resources. In this context, the Man and the Biosphere Programme (MAB) is designed to provide the scientific base and the qualified personnel needed to deal with problems concerning the rational use and conservation of natural resources and the ecological management of territories and human settlements. Action under the MAB programme concerns more than a hundred countries, covering tropical forests, temperate and Mediterranean zones, arid and semi-arid zones, island and coastal ecosystems, mountains and human settlements. Through its action, MAB has made possible the extensive mobilization of national and international scientific circles, after resulting in the establishment of public and private institutions for specialized environmental research and training in a large number of Member States.

16. The **International Geological Correlation Programme** (IGCP) is implemented jointly by Unesco and the International Union of

Geological Sciences. Its purpose is to promote and co-ordinate research on geological problems of worldwide significance by establishing spatio-temporal correlations and making better known the history of the planet and the origin and formation of mineral and energy resources. The objective of the **International Hydrological Programme** (IHP) is to make an exhaustive appraisal of the freshwater resources of the different regions of the world and to develop the scientific and technological base for the rational, management of those resources from both the quantitative and qualitative standpoints. The programmes of the **International Oceanographic Commission** (IOC) and Unesco's supplementary programme on the marine sciences are aimed at improving understanding of the ocean so as to enable its resources to be used without damage to the ecosystem. In the context of the marine sciences, the COMAR project involves the implementation of research and training activities with a view to the integrated management of coastal systems. Mention should also be made of the **Programme on Natural Hazards.** All these scientific programmes carried out by Unesco include a significant training component.

17. Furthermore, in the context of its policy for the promotion of self-reliant social and economic development, UNEP assigns priority to the quantitative and qualitative strengthening of the human resources of the developing countries. To this end, it has incoporated an environmental training component into all its programme activities and encourages the systematic inclusion of the environmental dimension in all training activities concerning development. The activities undertaken in this field are aimed both at decision-makers (administrators and planners, entrepreneurs and trade unionists, engineers and farmers, etc.) and at specialists whose activities have a significant impact on the environment (biologists, economists, ecologists, hydrologists, meteorologists, toxicologists, agronomists, oceanographers, sanitary engineers, etc.). In all cases UNEP has laid emphasis on the strengthening of national networks and on the awarding of training grants to high-level professionals whose activities are likely to have a significant influence on the framing of national environmental training policies.

18. Through its international and regional programmes, its specialized services and centres, UNEP has in ten years trained more than 10,000 professionals and specialists from the developing countries. This action is continuing through UNEP's varied institutional machinery. Mention should be made in this connection of the **Oceans and Coastal Areas Programme Activity Centre** (OCA/PAC), which expects to train some 500 experts yearly in 1988-1989 (sources, levels and effects of various pollutants and protection of biological resources); the **Programme on Desertification Control,** which aims to co-ordinate the activities undertaken regionally and throughout the world to combat desertification, is developing training courses for specialists in various fields, in collaboration with other international organizations, in order to increase local capacity for action; lastly, INFOTERRA, which plans, during the 1988-1989 biennium, to strengthen and develop its network of environmental focal points through the implementation of training programmes aimed at computerizing some of the operations of those focal points and at establishing computer links within the network.

19. Attention should be drawn in this connection to the training courses offered by UNEP in the context of its environmental management services within the framework of which integrated environmental training courses are provided concerning soil, water, atmosphere, wild-life, energy, health, legislation, industry and environment, development planning, desertification control, etc. UNEP also offers training courses for environmental specialists in relation with its worldwide monitoring programme Earthwatch and within the framework of the activities of the International Register of Potentially Toxic Chemicals (IRPTC).

20. IEEP and the scientific programmes for research and the training of specialists developed by Unesco and UNEP have no doubt made a significant contribution, both nationally and internationally, to the development of environmental awareness, education and training for sustainable development. However, owing to the magnitude of the conceptual, educational and institutional changes necessitated by the universalization of a new 'environmental culture', and in view of the problems newly created by human action on the environment, the efforts already made must be continued and intensified through the adoption of such measures as will enhance their effectiveness and their relevance.

21. Such is the main objective of the remainder of this document, which sets forth an international strategy for action in the field of environmental education and training for the 1990s, as discussed and approved by the Unesco-UNEP International Congress on Environmental Education and Training, held in Moscow, USSR, 17-21 August 1987.

International Strategy for action in the field of environmental education and training for the 1990s.

I. Environmental problems and the aims of an international strategy for action in the field of environmental education and training.

"Whereas it is a fact that biological and physical features constitute the natural basis of the human environment, its ethical, social, cultural and economic dimensions also play their part in determining the lines of approach and the instruments whereby people may understand and make better use of natural resources in satisfying their needs."

(Final Report, Tbilisi Conference, 1977, page 25)

1. In recent years there has been a gradual awareness, both worldwide and within each individual State, of the role to be played by education in understanding, preventing and solving environmental problems. We know now that the key to these problems to a large extent lies in social, economic and cultural factors, which are at the root of these problems, and that we cannot therefore prevent or solve them by purely technological means; we know that we shall have to act primarily on the values, attitudes and behaviour of individuals and groups in respect of their environment.

2. Despite this increasing awareness of environmental problems and the undeniable efforts of many countries to develop the technical and institutional means to cope with them, we are bound to acknowledge that, in general, the actions undertaken to date have proved insufficient to counteract the steady deterioration in the quality of the environment. Rarely has the international environmental situation looked so alarming. The growing disparities in levels of development and living conditions between different countries, and in many instances within countries themselves, have tended to worsen the outlook for the future by making contemporary environmental problems especially diverse and complex.

3. In most developing countries, regardless of the region to which they belong, the basic problem is one of dire poverty, which in turn leads to deterioration of natural resources: to eat and find shelter results in the destruction of equilibria on which the preservation of ecosystems depends and hence of the natural resources that ensure their survival. In many countries over the past decade, impoverishment brought about by a combination of fast population growth and sluggish or halted economic development, or indeed in some cases economic regression, has thus continued to aggravate the process of deforestation, soil erosion and desertification, while at the same time lowering agricultural output. Impoverishment and population growth are part of a single complex phenomenon that can only be halted by means of a process of rapid, sustained development compatible with the preservation of the productive potential of natural and anthropogenic ecosystems.

4. Further, most developing countries have had to contend with environmental problems, such as desertification, unchecked urban growth, and the pollution caused by industrialization. In this context, deforestation represents one of the paramount dangers, since it has harmful consequences both for human populations and for the preservation of flora and fauna. It has been responsible for a large number of floods, for the erosion of productive land and for the decline in hydroelectric potential. It has also resulted in the destruction of plant and animal species, in some cases irreversibly destabilizing the ecosystems on which human life and the genetic wealth of the biosphere depend. Some 25,000 plant species and more than 1,000 animal species are currently threatened with extinction.

5. The industrialized countries too are at grips with environmental problems fundamentally linked to their prevalent models of growth and that include, first and foremost, the exhaustion of certain natural resources and the various types of pollution. Industrial pollution is still the major threat to the quality of the environment. Acid rain caused by the emission of sulphur particles into the air has destroyed large tracts of forest in Europe; impairment of the ozone layer by chlorofluorocarbons, and the warming of the Earth caused by the 'greenhouse effect' resulting from the discharge into the atmosphere of larger amounts of carbon dioxide and increased pollution could represent unprecedented threats to the quality of life on our planet.

6. Aquatic environments continue to be polluted by industrial discharges and household waste. Concerning the marine environment, it should be noted however that intensification of the action taken by UNEP, under the regional seas programme, has enabled 100 coastal countries to be associated with the establishment of plans of action and conventions concerning at least ten maritime subregions. With regard to freshwater resources, progress has been achieved thanks notably to a transnational approach to the management of certain river basins.

7. This brief description of environmental problems would be incomplete if no mention were made here of the very serious industrial accidents that have brought a great deal of death, injury and disease in their wake and done harm to the environment Seveso, Bhopal, Chernobyl and the Rhine. All these accidents have highlighted the threats that certain industries pose to human life and the quality of the environment unless they are operated under very strict safety conditions.

8. Lastly, although the worldwide health situation, which is one of the prime indicators of the global quality of the human environment, has improved in general over the past ten years, morbidity and mortality rates have risen in a number of developing countries, particularly as a result of infectious and parasitic diseases, which

are often linked to situations of malnutrition affecting high-risk groups (especially women and young children). In the industrial countries, on the other hand, but also increasingly in the modern parts of the developing countries, what is mainly deplored is the higher incidence of disease connected with living conditions in urban industrial areas: cardiovascular and respiratory diseases, cancer and pyscho-social disturbances.

9. All these problems unquestionably result from socio-economic situations and inappropriate human behaviour patterns (poverty, uncontrolled economic growth, squandering of natural resources, etc.). It is therefore by acting upon systems of knowledge and values that we may hope to find adequate solutions to environmental problems. It is therefore incumbent upon education and training, as the fundamental means of integration and of social and cultural change, to envisage objectives and employ new methods capable of making individuals more aware, more responsible, and functionally better prepared to cope with the challenges of preserving the quality of the environment and life, in the context of sustained development for all peoples.

10. In response to these challenges, an international strategy for environmental education and training should seek in the 1990s to consolidate the main lines of approach charted by the Tbilisi Conference of 1977 and the Moscow Congress of 1987, adapting them to the new concerns. In particular, an effort should be made to promote: (i) the search for and implementation of effective models of environmental education, training and information; (ii) general awareness of the causes and effects of environmental problems; (iii) general acceptance of the need for an integrated approach to solving these problems; (iv) training, at various levels, of the personnel needed for the rational management of the environment in view of achieving sustainable development at community, national, regional and worldwide levels.

II. Principles and essential characteristics of environmental education and training

"EE must help create an awareness of the economic, political and ecological interdependence of the modern world so as to enhance a spirit of responsibility and solidarity among nations. This is a prerequisite for solving serious environmental problems."

(Final Report, Tbilisi Conference, 1977, page 12)

11. Recommendations of the Tbilisi Conference (1977) on environmental education goals, objectives and guiding principles are to be considered as providing the basic framework for environmental education at all levels, inside or outside the school system.

12. Environmental education (EE) is regarded as a permanent process in which individuals and the community gain awareness of their environment and acquire the knowledge, values, skills, experiences, and also the determination which will enable them to act – individually and collectively – to solve present and future environmental problems.

13. The goals of EE cannot be defined without taking account of the economic, social and ecological realities of each society, or of the objectives it has set for its development. However, one can point to certain objectives of EE that are common to the entire international community.

14. Where knowledge is concerned, it falls to EE to supply – in ways worked out according to the groups at which it is aimed – the means of perceiving and understanding the various biological, physical, social, economic and cultural factors which interact in time and space to shape the environment, and of acting to prevent and solve problems in this sphere. Wherever possible, the knowledge in question should be acquired through observation, study and practical experience of specific environments.

15. It also falls to EE to define values and motivations conducive to behaviour patterns and measures that are instrumental in preserving and improving the environment. Behaviour patterns will never really be able to change as long as most members of a given society have not freely and consciously internalized more positive values **vis-à-vis** the environment, values capable of underpinning self-discipline. To this end, EE seeks to clarify and harmonize the ethical, aesthetic and economic concerns and values of individuals and communities, in so far as these influence their perception of the environment.

16. No doubt the most important factor contributing to the specificity of EE is its emphasis on the resolution of practical problems affecting the human environment. From this derives another of its fundamental characteristics, namely, the interdisciplinary approach it adopts to take account of the complexity of environmental problems and of the multiplicity of the factors accounting for them.

17. By virtue of its objectives and its functions EE is necessarily a form of educational practice attuned to the life of society. It can only be effective if all members of society – workers, students, specialists, decision-makers – take part according to their abilities in the complex and manifold task of improving people's relationships with their environment. This can only be achieved if people take their own education in hand and become aware of their involvement and their responsibilities.

18. Because EE is a lifelong process, it can help to improve the relevance of general education. EE is more than just a particular aspect of the educational process; it should be regarded as an excellent basis on which to develop a new way of living in harmony with the environment, a new lifestyle. EE should be aimed at all members of a community, in ways corresponding to the needs, interests and motivations of the different age-groups and socio-occupational categories; it should be adapted to different socio-economic and cultural contexts and to different living conditions, and should take account of regional and national differences. In this way, EE will be able to provide the different actors in society with the scientific and technical knowledge and the moral qualities that will enable them to play an effective part in preparing and then managing a development process compatible with preservation of the productive potential and the aesthetic values of the environment.

19. In view of the environmental problems facing contemporary society and the role that EE can play in solving them, the following chapter of this document indicates an international strategy for action to develop environmental education and training in the 1990s.

III. Guidelines, objectives and actions for an international strategy for the 1990s.

A. Access to Information

Guideline for the strategy:

"The dissemination of specialized and general knowledge on the environment and the development of public awareness of the need for a correct approach to the problems of the environment are of ... possibly crucial importance, both for further economic development and for rational use of the earth's resources for the good of ... humanity as a whole. The full use of the mass media for truly educational ends would help ... to ensure widespread awareness and understanding of these matters."

(Final Report, Tbilisi Conference, 1977, page 37)

Objective:
Strengthening of the international system for information and exchange of experience of the International Environmental Education Programme (IEEP).

Action: 1: Setting up a computerized service.

20. Over the past decade, the international community, especially Unesco and UNEP, has devoted considerable efforts to promoting exchanges of information and the dissemination of new knowledge and ideas on the subject of environmental education. We are bound to acknowledge, however, that there remain considerable needs for information on this subject, not only because of the relative shortage of resources employed for this purpose, but also because of the multiplier effect of the needs aroused by what has been achieved. In a growing number of countries, new people and new groups concerned by activities designed to develop environmental education are demanding information, or are even producing information themselves. Current problems involve the information materials themselves (whether easily understood as visual or written messages, how to meet the current overflow of information, etc.) and educational strategies (how to "master" the information flow, how to look at visual materials, etc.).

21. It looks today as if, much as the exchange of information and experience is imperative for the achievement of universal environmental education, the prevalent information strategies are ill-suited to meet new needs. It is essential, in this respect, to favour those approaches that have proven most effective, and above all to envisage new means of gaining access to information, reorganizing it and disseminating it for the different users.

22. For swifter and more systematic collection of the findings of environmental research and other information relevant to environmental education, and their dissemination to pedagogical research institutions, as well as to improve the flow of information between the latter and the institutions and specialists responsible for preparing educational and training programmes, an International Computerized Information Service for EE – ICISEE – should be set up. Unesco and UNEP, as a matter of high priority, should jointly examine the requirements and methods of its establishment. All institutions actively involved in this sphere should have free access to this service through switched networks (conventional or packet switching networks) and through other means which have proven to be effective and which do not discriminate on the basis of technological development.

23. This service could be run within an international framework designed to facilitate access to data from a variety of sources, providing reasonably rapid dissemination and capable of keeping the system operating properly and technically well maintained. To reduce operating costs, the service could make use of technical facilities existing within the framework of IEEP and of INFOTERRA.

24. The ICISEE would be responsible for processing and disseminating general and technical information capable of promoting EE and helping to enhance the effectiveness of efforts in this direction. To this end, it ought gradually to implement, over the next ten years, a series of data bases containing selected, annotated bibliographies, summaries of articles and books, and progress reports on national action, news on current events, as well as directories of institutions, programmes and people involved in environmental education activities. The ICISEE could be launched at relatively low cost by initially computerizing a selection of technical and general information published over a period of at least ten years by IEEP and then disseminating it.

25. Among themes especially deserving of attention, it is worth mentioning the results of pedagogical research and experiments in the field of EE, suggested models for national planning of EE, and the approaches and strategies employed for the design and transmission of educational messages. Similarly, priority should be given to the gathering and processing of information on legal measures taken by Member States with regard to EE.

Action 2: Strengthening regional networks of institutions of excellence and documentation centres.

26. The development, first, of the international network of environmental education, but also of other networks existing in Unesco and UNEP (Unesco's networks of educational innovation, UNEP's regional training networks or the INFOTERRA network of environmental focal points, etc.), together with the strengthening of the documentation units of the Regional Offices of Unesco and UNEP, is another necessary aspect of the development of the international information system existing within the framework of IEEP. With this end in view, documentation centres could serve as focal points for sorting and channelling local information, in order to impart an international character to the data bases made available to the world community via a computerized network. Apart from contributing to the gathering of information, institutions of excellence could communicate the results of their research and experiments in environmental education and training to the documentation centres.

27. Regional activities for the documentation centres should include the grouping together of available information on EE, in particular by way of the following measures: (i) updating publications; (ii) preparing summaries in respect of EE for different target groups (researchers, specialists by theme, curriculum development specialists, educational planners, teachers, etc.); (iii) translation of certain materials; (iv) selective dissemination of information. On this basis, the regional documentation centres are ideally placed to produce regional supplements for the newsletter **Connect.**

28. The implementation of specialized documentation activities in the field of EE should necessarily be accompanied by programmes to train the personnel of the documentation centres concerned.

Action 3: Publication of the newsletter Connect.

29. The Unesco – UNEP IEEP quarterly newsletter **Connect,** which currently has a circulation of some 13,000 in five languages (shortly six), has proved to be one of the most effective international information media in the field of environmental education to date. Publication of this periodical will be continued and expanded. The production of the newsletter in other languages with the help of new sources of funding, and the publication of regional supplements focusing on items of local interest, would add to the relevance of **Connect** and encourage the growth of its regional readership.

30. Further, in line with what has already been done in Latin America and the USSR, decentralization of the printing and distribution of **Connect** to other regions will help to reduce current production costs and boost circulation, in response to fast-growing demand.

B. Research and Experimentation

Guidelines for the strategy:

"The institutional and educational changes required for the incorporation of environmental education into national education systems should be based not only on experience but also on research and evaluation aimed at improving educational policy decisions. The reinforcement of research and experimentation on the lines of emphasis, content, methods and instruments necessary for environmental education call to special attention."

(Final Report, Tbilisi Conference, 1977, page 23, 38)

31. Over the past decade, a great deal of educational research and experimentation has been undertaken in Member States in all regions with a view to devising innovations, on the basis of a rational analysis of needs and problems, in the content, methods and strategies of an education and training in keeping with the principles and objectives of EE.

32. This research has made it possible to work out new ways of integrating educational content, through the use of integrative themes and systems approaches, as well as active teaching methods designed to foster involvement, social commitment and a sense of responsibility on the part of the target populations for environmental education.

33. The development of EE is still incomplete, however, and new, conceptual and methodological questions remain insufficiently elucidated. For example, after a series of experiments in a number of Member States, some specialists question whether, given the psychological and corporative resistance encountered, it is advisable to go on envisaging the teaching of EE by exclusively interdisciplinary teaching teams. Two other approaches could be taken: (a) a multidisciplinary approach incorporating environmental problems into individual disciplines; and (b) an integrated or interdisciplinary approach incorporating the environmental dimension in special disciplines, including man-nature interactions, taught by multidisciplinary teams.

34. Important educational and training needs remain unmet, and new needs are arising as a result of the extension of EE to new categories, such as general higher education, technical and vocational education, education for the general public, training for computer specialists, etc. Furthermore, the need to train a sufficient number of qualified personnel (teachers, environmental specialists, educational planners, administrators, industrial managers, etc.) capable of playing a significant role in national decision-making, should be borne in mind when new ways and means of providing environmental training are being sought.

35. The shortage of available financial resources for education in general and for environmental education and training in particular, make it essential to define clear and realistic aims in this sphere, and hence to undertake research and experiments aimed at developing more relevant educational content and devising more effective methods of organizing and transmitting educational messages.

Objective: Strengthening of research and experimentation on educational content and methods and strategies for the organization and transmission of messages concerning environmental education and training.

Action 1: Research and experiments concerning educational content and methods.

36. In view of the fact that basic environmental education needs further development, research programmes are required in this regard. Such programmes would refine fundamental concepts of an ecological culture, formulate the standards of an environmental ethic and environmental law, and elaborate psychological and pedagogical methodologies for environmental education of all social groups.

37. Experiments and pilot projects will be undertaken with a view to developing and implementing education, training and information programmes, notably for general university education and for public information on environmental issues, in keeping with the objectives, institutional possibilities and needs of Member States in this sphere.

38. A general research and experimentation project should be organized aiming at the identification of basic components of the theory and methods of environmental education. It could be conducted by a group of Unesco-UNEP experts in cooperation with IUCN and the International Society on Environmental Education (ISEE). The project should include: (a) the basic concept of an ecological culture; (b) ethical and legalistic approaches to attitudes concerning society and nature, war and peace; (c) approaches to the economic evaluation of use of natural resources; and (d) psychological and pedagogical approaches to the education of all layers and sectors of the population.

39. Research activities and experiments concerning teaching and learning methods conducive to the development of education programmes slanted towards the solving of practical environmental problems and generating a sense of social responsibility in the various parties involved in the educational process will be continued and strengthened.

40. Because environmental problems are to a large extent the outcome of human choices, a special effort will be made through research and experimentation to develop content for environmental education and training that takes into account research findings in the various social sciences. Research itself on the environment and didactic aspects of the environment is essential for environmental education at the university level. Such research should consider primary concepts, target publics, didactic tools and practises, etc.

Action 2: Research and experimentation concerning other complementary aspects of environmental education.

41. Research will be undertaken with a view to identifying points of convergence and complementarity with other educational activities whose subject-matter relates to fundamental aspects of the human environment, in particular population education and education concerning questions of nutrition and health as well as to the vital issues for mankind of international understanding and peace. Experimental and pilot projects incorporating these various dimensions will be launched on the basis of the resulting research findings, with a view to developing content making it possible to increase the relevance and functionality of environmental education and training. To this end, appropriate links will be established with existing international programmes in these spheres.

Action 3: Research concerning the pedagogical approach to the question of values.

42. EE is not an educational approach confined purely to the transmission of knowledge; it is also concerned with affective and axiological matters. These are essential when one is seeking to generate permanent patterns of behaviour calculated to preserve and improve the quality of the human environment. With this end in view, it is necessary to conduct research and experiments on ways of dealing, in the educational context and in the light of the different target populations, with questions relating to the shaping of attitudes and

values in respect of the environment and associated problems.

Action 4: Research concerning new strategies for the transmission of messages to develop environmental awareness, education and training.

43. In response to increasingly urgent quantitative and qualitative demand from the international community for environmental education, and in view of the necessarily limited amount of available resources, research and experiments designed to define more effective, including more cost-effective, strategies for the transmission of educational messages will be conducted.

44. In this respect, new approaches will be devoted to the training of teaching staff, in the light of the various objectives being pursued (awareness, transmitting knowledge, shaping values, etc.), and to educating and informing the public so as to design EE programmes that provide a more specific and more relevant response to the needs of the various target populations. To this end, research will be developed on ways of using new information and communication technologies (data processing, teleprocessing, video, etc.)

Action 5: Comparative evaluation research on the different components of the educational process.

45. One essential, though often overlooked, aspect of the implementation of EE is the need to evaluate the complex teaching and learning processes that it involves. Effective development of EE at the international and national levels depends on the formulation of relevant educational messages, tailored to well-defined objectives adapted to the needs of different sections of the population.

46. **It is therefore essential to** undertake systematic research to evaluate the real effectiveness of educational and training processes, with a view to making, where appropriate, the necessary adjustments to improve their relevance. Methods of evaluating the results of education that involve simulation of environmental issues and practical measures for acting upon the environment are best suited to assess the complex skills – other than cognitive – which EE ought to be capable of inculcating. These involve decision-making abilities, problem-solving skills, the ability to plan actions and to induce values capable of shaping appropriate individual and group attitudes towards the environment.

47. Similarly, research on the respective advantages of different strategies, both old and new, directed towards the organization and transmission of educational messages is essential if we are to increase the cost-effectiveness of efforts to develop EE. This holds for action taken by Member States as well as for initiatives on the part of the international bodies concerned.

48. An additional area of research should be research into the knowledge and attitudes concerning the environment held by potential learner groups. This is particularly important with regard to the environmental training of teachers who emerge from a process of traditional, single-discipline education.

C. Educational Programmes and Teaching Materials

Guideline for the strategy:

"Environmental education should not be just one more subject to add to existing programmes, but should be incorporated into programmes intended for all learners, whatever their age... Its subject-matter should permeate every part of formal and non-formal programmes and constitute one and the same continuous, organic process... The central idea is to attain, by means of growing interdisciplinarity and of prior co-ordination of disciplines, a practical education oriented towards a solution of the problems of the environment, or at least to make pupils better equipped ... to participate in decision-making."

(Final Report, Tbilisi Conference, 1977, page 20)

49. EE is now acknowledged to be an excellent means of enhancing the relevance and functionality of general education, but persistent difficulties of a conceptual and structural nature within education systems still prevent it from being implemented in truly interdisciplinary ways. For this reason, Member States have been led to consider various methods of incorporating the environmental dimension into curricular and of designing appropriate teaching materials. The Moscow Congress agreed that environmental education should simultaneously attempt to create awareness, transmit information, teach knowledge, develop habits and skills, promote values, provide criteria and standards and present guidelines for problem-solving and decision-making. It therefore aims at both cognitive and affective behaviour modification. The latter necessitates both classroom and field activities, thus an action-oriented, project-centred and participatory process leading to self-confidence, positive attitudes and personal commitment to environmental protection. Furthermore, the process should be implemented through an interdisciplinary

50. The adoption of an interdisciplinary approach presupposes a shift in the emphasis of the entire educational process, affecting content, teaching methods, institutional organization and teacher training. These far-reaching changes can only take effect very slowly, as educational reforms are gradually introduced.

51. The required modification of behaviour needs an "educative atmosphere" both within and without the school for the entire span of pre-school to university education and

Countries present at the Moscow Congress (August — 1987).

1. AFGHANISTAN
2. ALGERIA
3. ANGOLA
4. ARGENTINA
5. AUSTRALIA
6. AUSTRIA
7. BANGLADESH
8. BARBADOS
9. BELGIUM
10. BENIN
11. BOTSWANA
12. BRAZIL
13. BULGARIA
14. BURKINA FASO
15. BURUNDI
16. BYELORUSSIAN SSR
17. CAMEROON
18. CANADA
19. CHAD
20. CHINA
21. COLOMBIA
22. COSTA RICA
23. CUBA
24. CZECHOSLOVAKIA
25. DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA
26. DENMARK
27. ECUADOR
28. EGYPT
29. ETHIOPIA
30. FINLAND
31. FRANCE
32. GAMBIA
33. GERMAN DEMOCRATIC REPUBLIC
34. GHANA
35. GREECE
36. GUINEA
37. HAITI
38. HUNGARY
39. INDIA
40. INDONESIA
41. IRAN (ISLAMIC REPUBLIC OF)
42. IRAQ
43. IRELAND
44. ISRAEL
45. ITALY
46. JAMAICA
47. JAPAN
48. KENYA
49. KUWAIT
50. LESOTHO
51. MADAGASCAR
52. MALAYSIA
53. MALI
54. MAURITIUS
55. MEXICO
56. MOZAMBIQUE
57. NAMIBIA
58. NEPAL
59. NETHERLANDS
60. NICARAGUA
61. NIGER
62. NIGERIA
63. NORWAY
64. PERU
65. PHILIPPINES
66. POLAND
67. REPUBLIC OF KOREA
68. RWANDA
69. SENEGAL
70. SINGAPORE
71. SPAIN
72. SRI LANKA
73. SUDAN
74. SURINAM
75. SWAZILAND
76. SWEDEN
77. SWITZERLAND
78. THAILAND
79. TOGO
80. TUNISIA
81. TURKEY
82. UGANDA
83. UKRAINIAN SSR
84. USSR
85. UNITED KINGDOM
86. UNITED REPUBLIC OF TANZANIA
87. UNITED STATES OF AMERICA
88. VENEZUELA
89. WEST GERMANY (FEDERAL REPUBLIC OF GERMANY)
90. YEMEN
91. YUGOSLAVIA
92. ZAIRE
93. ZAMBIA
94. ZIMBABWE

Stylised map, not actual boundaries.

after. In this connection, the role of non-formal education is to be emphasized. The goal is to make the school environment itself an example of how an environment could be and should be protected and improved and made healthier, eventually producing generations of environmentally conscious citizens. Additionally, incorporation of traditional cultural practices into the EE curriculum can result in a natural evolution of students' attitudes and behaviour towards the environment rather than appear as drastically different from existing community attitudes and behaviour. Community school involvement in environmental education would further help this development and should be enlisted.

52. For instance, experience shows that in a fair number of cases EE consists in practice in simply giving more appropriate treatment to environmental questions already featured in the curricula of various subjects; or, more ambitiously, in introducing environmental components into certain disciplines, particularly in the natural sciences and, to a lesser extent, the social and human sciences. In some cases, these components have been introduced in preference in what are known as 'pivotal' disciplines, such as geography and ecology: because they cover a very broad field, they lend themselves more readily to an understanding of the complexity of environmental problems and to the development of interdisciplinary approaches.

Objective: Promotion of EE through the development of curricular and teaching materials for general education.

Action 1: Exchange of information on curriculum development.

53. The exchange of information and experience, concerning educational programmes and materials adopted by Member States is an essential factor in the spread and rationalization of efforts to make EE available throughout the world. With this end in view, an international information network for environmental education could ensure the systematic gathering of data on national achievements and could make these data available to users through various media and in various forms. This implies a national system or center of environmental education information.

54. It is strongly recommended that each country or institution adopt these measures: (a) creation of banks (resource centres, clearing houses, etc.) of environmental education curricula, textbooks, teaching aids and similar items at all levels (local to international); (b) promotion of institutional networking for the purpose of mutual support and cooperation among institutions engaged in experiment, research and training in environmental education; and (c) facilitation of the exchange of information through newsletters, journals, etc., as well as dissemination of curricula guidelines, manuals and other exemplary items for teachers.

Action 2: Development of model (prototype) curricula

55. While it is true that curricula and teaching materials are not enough in themselves to engender the desired pedagogical practice, or to encourage educators to adopt the appropriate attitudes and acquire the requisite knowledge for the development of EE, they nevertheless represent an essential basis for guiding the work of teachers and pupils in so complex a field.

56. With this end in view, measures will be augmented for the development of prototype curricula for the different levels and forms of education and of pre-service teacher training. In addition, short courses treating contemporary environmental issues in an integrated manner will be developed to facilitate the retraining of key educational personnel and teachers in general education and intermediate technical and vocational education in the principal subjects concerned

57. These measures will be taken in the context of an **overall programme** that takes past experience and existing curricula into account, thereby making it possible to ensure the relevance of the pedagogical approaches adopted and to rationalize the efforts involved. In this context, practical activities will be carried out in conjunction with the national institutions responsible for the design and implementation of curricula and educational materials, so that they can be suitably adapted to national educational, environmental and development policies.

58. Operational education projects implemented by Unesco with the support of UNDP or the World Bank etc. should require the incorporation of an environmental dimension from their inception.

59. Closely-related subjects with common elements, such as environment, health, nutrition, population, development, and peace and international understanding may be combined and incorporated into one subject area. Curriculum-development and teacher-training activities related to problem-solving, decision-making and environmental attitudes should be given a priority. Positive achievements in overcoming environmental problems should be encouraged in order to develop the confidence and motivation of pupils and students. Environmental education should relate both the protection of nature in rural areas and the protection of human life and environment in cities. Prototype curricula should encompass flexibility, the fostering of a love of nature and sense of responsibility towards it, and focusing on behaviour modification and attitude development as more important than acquiring information. Environmental education should be linked to sustainable development as indicated in the World Conservation Strategy. Formal environmental education efforts should be linked with non-formal activities of NGOs and youth movements, such as Boy Scouts, Young Nature Lovers, etc., to the advantage of all. EE curriculum should be developed in consultation with young people in order that the programme reflect their interest and concern.

Action 3: Development of new teaching aids.

60. Educational technology may be utilized to develop teaching and learning aids to facilitate environmental education. Such items once developed in one centre may be used universally, or with some modification. Therefore preparation of such aids should become the responsibility of more centrally located and better equipped centres rather than expecting each institution to develop them.

61. Conventional teaching materials (teachers' guides and handbooks, modules, etc.), which convey information essentially in printed form, will continue to be developed, but there is a need for new teaching aids capable of organizing the requisite knowledge in ways that are more representative of the real environmen-

tal issues.

62. Thus, for instance, games and simulations which take the environment as their subject and use various micro-environments (towns, forests, parks, factories, zoological gardens, etc.) as educational itineraries will throw into sharper relief the role of scientific knowledge in both the social and the natural sciences, together with the functions to be fulfilled by technological know-how, as well as the place of social and ethical values in the making of complex decisions and in the preparation of measures to solve environmental problems. In short, realistic computer and other games and simulation models should be developed in order to give learners an understanding of actual and future environmental problems.

Action 4: Promoting curriculum evaluation.

63. Systematic evaluation of curricula and of educational materials is essential if environmental education is to achieve its objectives, at both the national and international levels. To encourage the general adoption of this practice, a critical survey will be made of approaches, methods and instruments used for the purposes of evaluation in different contexts. If necessary, more appropriate and more reliable instruments will be developed. Lastly, provision will be made for an evaluation component in the implementation of all educational programmes and in the utilization of teaching materials.

64. Additional, curriculum-evaluation strategy should include activities concerned with developing examinations, tests or assessment procedures which reflect the content of environmental education as well as problem-solving and decision-making attitudes. A major criterion for judging the content and methods of environmental education in schools should be their appropriateness for students after leaving school, i.e., looking ten or even thirty years ahead, In-depth evaluation of both successful and less successful environmental education projects can help new project initiatives to anticipate possible problems. Efforts should be made to include an environmental component in examination which lead to entrance into educational institutions and/or qualification for certificates and diplomas at different educational levels.

D. Training of Personnel

Guideline for the strategy:

"The training of qualified personnel is ... a priority activity. This holds good for both pre- and in-service training, for the purpose of familiarizing teachers in formal education and organizers of non-formal activities for young people and adults with environment-linked subject-matter and educational and methodological guidelines."

(Final Report, Tbilisi Conference, 1977, page 20)

65. **Teacher training** is a key factor in the development of EE. The application of new environmental education programmes and proper use of teaching materials depends on suitably-trained personnel, as regards both the content and the methods specific to this form of education. Teachers well trained in the contents, methods and process of EE development can also play a crucial role in spreading the impact of EE at the national level, thereby increasing the cost-effectiveness of the efforts made by Member States to develop environmental education.

66. Despite undeniable progress achieved in the training of personnel for EE over the past decade, and despite the value of certain national initiatives, considerable needs remain unmet in all regions of the world, and these needs are likely to become even more pressing in the future as a result of growing demand. There is a shortage of qualified teachers for EE at all levels, but especially for intermediate formal instruction, general university education and education of the public.

67. A number of strategies have been devised to provide environment-linked teacher training, and their effectiveness has proved highly variable. For example, pre-service teacher training might legitimately be considered the best possible means of inculcating qualitatively and quantitatively suitable knowledge, yet inherent pedagogical and institutional difficulties in most countries have generally caused such training to be confined to limited attempts to introduce some basic knowledge of the environment into the disciplines that have historically been most concerned with environmental questions (biology, ecology, chemistry, etc.)

68. Plans for the environmental training of teachers should be practical, i.e., implementable by training authorities. The environmental training should include a holistic culture base as a fundamental concept. Experts used in the teacher-training process should themselves be made environmentally aware and trained in teaching and communication. Each trainee should be viewed as a future environmental trainer of teachers, thus a multiplying factor. Teacher associations can facilitate the exchange of information and personnel.

69. A growing number of Member States in all regions have introduced in-service teacher-training programmes on the environment, in the form of seminars, classes, practical courses, etc. In-service training is often a starting-point, and sometimes even the sole means of providing appropriate environmental training for teachers already in service.

70. There is a need to identify the national objectives of the training of teachers and to develop plans for the training of teachers which can be implemented by the training authorities. Since the environmental situation of a culture is influenced by education for the training of teachers, training in environmental education should include a holistic culture base as a fundamental concept. There is a need to provide courses in the nature and communication of environmental education for the training of teachers, especially in interdisciplinary methodologies. Environmental education programmes encourage the use of specialists as resources for the progam= mes. Such experts need to be trained in teaching and communication techniques. All teacher training programmes should be designed with maximizing

multiplier effects: each training recipient should be considered a future trainer of other teachers in the methodology and practice of environmental education. Environmental education programmes should include a moral or ethics dimension for which the teachers should be a model.

Objective: Promotion of pre- and in-service training for qualified formal and non-formal environmental education personnel.

Action 1: Promoting pre-service training.

71. In both the medium and the long term, the best way of ensuring the sustained development of EE at the national level is to incorporate the environmental dimension into the pre-service training of teachers and other educational personnel, particularly for the various natural and social science disciplines and for intermediate-level technological disciplines. Through the educational reforms undertaken by Member States, an effort should be made to ensure a proper place for this essential EE approach in new national education plans and programmes.

72. The initial training of teachers should include practical experience and work with other experts in the development and implementation of environmental education programmes. Trainers of primary-school teachers should be taught principles of environmental protection.

Action 2: Promoting in-service training.

73. Because only the retraining of personnel at all levels and in all categories of education can meet the immediate requirements of the development of EE, this is a training priority. It is therefore necessary to strengthen retraining activities and to devise, test and evaluate new forms of in-service training, in order to enhance the qualitative impact of retraining, while at the same time reducing the financial burden for States. A core of teacher-trainers and specialists should be developed in each country to train teachers and, for the specialists, to keep track of recent environmental developments and research results worldwide and to pass them on to the appropriate agencies or personnel.

74. Experiments in self-instruction and distance training involving the use of various media (press, radio, television, video and computer-assisted education), which have been conducted in a number of countries, will be systematically evaluated in order to determine whether they are suitable for transposition to other regions or countries. The experimental projects conducted within the framework of IEEP in co-operation with the competent institutions of Member States will serve as a framework for this venture.

75. There is a need for preparation and continual revision and updating of core-curricula, guidelines, manuals and reference materials for teachers, school principals, educational administrators and other educational personnel. That is, in addition to teachers, other agents in the educational system should receive training and re-training.

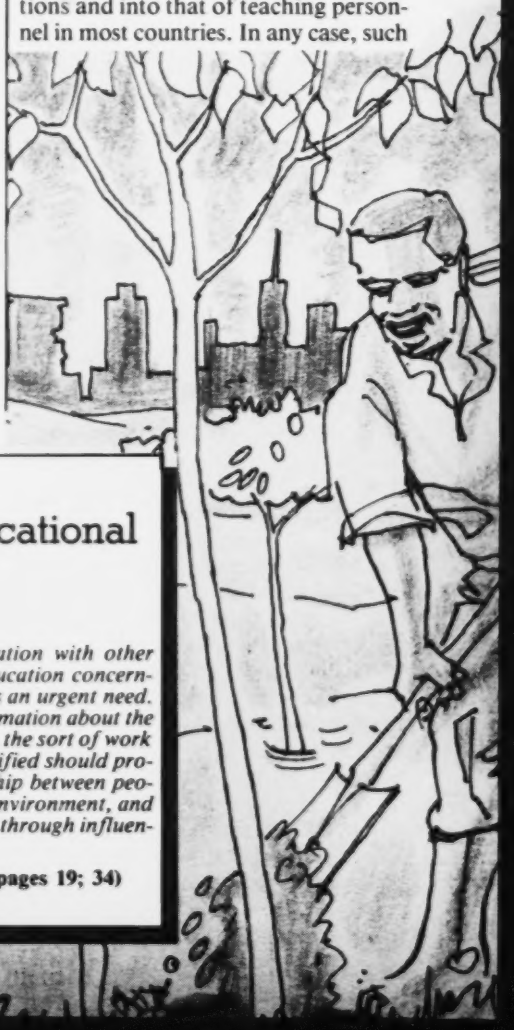
76. Regional and inter-regional exchanges of teachers can enhance national environmental education practice. Teachers need training in the techniques of persuasion for use with educational administrators regarding facilities, exchanges, resource development, etc.

77. IEEP training activities for teachers and other key educational personnel which are conducted by means of meetings, seminars, workshops, courses, etc. at the regional, subregional and national levels, should be carried out in joint collaboration with educational institutions that have emerged as centres of excellence with established infrastructures, human resources and facilities that can ensure appropriate immediate and long-term impact.

78. Among the educational personnel for whom environmental training is a priority, particular mention should be made of the personnel in charge of non-formal educational activities, especially instructors for adult education, workers education, management training, rural education, health and nutrition education, literacy training, etc. An environmental education training component should also be included in all projects relating to non-formal education, certainly those undertaken within the framework of IEEP, and in all UN operational projects.

79. The work of technicians and intermediate-level professionals – blue-collar workers, farmers, business and industrial cadres, craftsmen, etc. – often has a considerable impact on natural resources and, consequently, on the conservation of the productive potential of both natural and anthropogenic ecosystems.

80. Notwithstanding the substantial efforts made by a number of Member States, the environmental dimension is still only marginally and insufficiently integrated into initial training for various intermediate technical and vocational specializations and into that of teaching personnel in most countries. In any case, such



E. Technical and Vocational Education

Guideline for the strategy:

"The integration of environmental education with other forms of education,-in particular with education concerning the working environment ... represents an urgent need. The curricula for these should include information about the environmental changes which result from the sort of work they will do. Vocational education so modified should promote increased awareness of the relationship between people and their social, physical and cultural environment, and foster a desire to improve the environment through influencing decision-making processes."

(Final Report, Tbilisi Conference, 1977, pages 19; 34)

training still lags a long way behind what is provided in general formal education. The reinforcement of environmental education in technical and vocational education should be a major priority for improving the quality of the environment in the context of sustainable development. The important results of the First International Congress of Technical and Vocational Education of Unesco (Berlin, 1987) should be combined with the tasks of environmental education in the teaching process.

81. The incorporation of environmental education into technical and vocational education and general education should be an integral part of the development plans of governments. There is a need to resolve the seeming contradiction between environmental protection requirements, environmental knowledge of technicians and their professional readiness to perform their expected functions. In this respect if should be noted that technical and vocational education should ideally relate human or technical activity and environmental protection as compatible within sustainable development.

Objective: Incorporation of an environmental dimension into technical and vocational education.

Action 1: Development of programmes and materials for education and training.

82. Encouragement will be given to measures to develop study programmes for the education of intermediate – level technicians and professionals, and for the training of teachers to provide this education. In this connection, care will be taken to avoid over-emphasis on problems specific to certain occupations in the content of these courses; rather, their content should seek to offer all categories concerned a general education in environmental matters.

83. With this end in mind, the model curricula and teaching materials already developed for general environmental education, notably within the framework of IEEP, will be supplemented by the development of study programmes and materials tailored to various technical and vocational specializations in the field of agriculture, industry and the services, selected in the light of their potential impact on the quality of the environment. These programmes should be developed, tested and evaluated in the context of IEEP's activities and in close collaboration with the competent national and regional institutions.

84. Basic to the above is the consideration that environmental education in technical and vocational education falls into these categories: (a) a common core of environmental education usually given in general education; (b) special knowledge and skills needed because of the sensitive interaction of technicians and the environment; and (c) the knowledge and skills needed in those professions which entail certain risks for the environment as well as having potential for enhancing it.

Action 2: Training and developing the awareness of teachers.

85. As in the case of general education, the most appropriate stage at which to train teachers is that of preservice training. Environment-linked subject-matter could, for instance, be integrated into specialist training courses in polytechnical colleges and agricultural and industrial training colleges, as well as in other institutions that train instructors for technical and vocational education. Prototype EE curricula based on the needs of different types of technical and vocational education (TVE) should be developed, tested and disseminated by IEEP.

86. Environmental awareness should also be developed through in-service training for teachers, instructors and other key personnel in various technical and vocational training institutions (agricultural) colleges, technical high schools, trade union technical training colleges, etc.). The development of short courses, comprising both general treatments of environmental problems, and content for specialists, would appear to be the most appropriate way of achieving this. In short, the training of teachers in technical and vocational education should fully reflect the objectives of environmental education.

Action 3: A priority activity in the service sector.

87. Tourism is one of the activities in the service sector which, by its international scope and its intensity, has the greatest impact on the environment. It is therefore urgent in some cases to devise forms of organized tourism which,,while ensuring the growth of this industry, will be more compatible with the conservation of the resources and aesthetic qualities of the environment. For this purpose, an international workshop on environmental education should be organized for those responsible for the national tourism services of the principal countries concerned. This workshop could be organized within the framework of IEEP which should try to identify potential national and international sources of funding for such a venture. Since tourism has a local as well as national level, educational actions should be organized accordingly. Lastly, guidelines for tourism should be framed in terms of both the natural and cultural environment of an area.

F. Educating and Informing the Public.

Guideline for the strategy:

"There is a need for environmental education programmes which introduce awareness among the general public of its own environment ... and for active participation of the general public in solving the environmental problems of contemporary society ... The mass media play an important part in the promotion of environmental education for they constitute ideal media for reaching the widest possible audience.

(Final Report, Tbilisi Conference, 1977, pages 21, 31)

88. Considerable progress has been made over the past ten years, particularly in the industrialized countries, in educating and informing the public (young people and adults, producers and consumers, executants and decision-makers alike), as a result of media exposure and greater public involvement in the activities of associations concerned with improving the environment. In a growing number of Member States, thousands of grassroots associations have sprung up and performed an important educational role, either directly through the work of their members or through media follow-up of their activities. Furthermore, the media have devoted tens of thousands of hours of broadcasting time to general public information programmes focusing on fundamental or other aspects of the environment. The contribution of international, regional and national NGOs, as well as natural history museums, parks and reserves, in educating the public has been particularly important.

89. However, although in some countries there has been a great change in the level of awareness of the environment and its problems, there still remain substantial unmet needs when one considers that the objective should be the creation of a genuine mass culture in respect of the environment, that is to say, a culture that is shared by all sectors of the population and by the majority of countries.

90. The difficulties and constraints that account for this situation are varied. First, one finds in general that the cost of preparation and production of programmes carried by the media (especially films and TV series), as well as royalty payments on productions already paid for, are often extremely high. This seriously curtails the production and distribution of programmes in many countries, especially the developing countries.

91. It has also been noted that, many information programmes, while seeking to reach all types of audiences, have had little impact on large sections of the population – and sometimes on those very people whose day-to-day activity most affects the quality of the environment. Hence the necessity for improving communication skills of scientists vis-a-vis the public; the role of women in community development and environmental education; use of local knowledge and traditional skills and values; and special environmental training and retraining programmes for the developing world.

92. Among the main obstacles to the development of genuine "environmental literacy", mention should also be made of the ambiguity of the information on this subject carried by the media. This is due to the diversity of the objectives and priorities that underlie these messages. It thus transpires that it is not always possible for people who lack the requisite education to interpret the messages aimed at them.

93. Another difficulty encountered in efforts to educate the public, which considerably limits their impact, is the absence of any practical content capable of giving rise to more appropriate behaviour vis-a-vis the environmental media, which do not allow the questions of individuals and groups to be easily answered, and partly to insufficient co-ordination between educational specialists and communication specialists when media programmes are being prepared. One solution has been inexpensive radio and TV programmes providing for interactive debates on environmental problems among scientists, planners, decision-makers and the general public. Radio programmes on the environment allowing public questions to participating experts have also been effective.

94. Certain measures are urgently required to resolve these difficulties. Apart from playing an essential role in developing general "environmental literacy", action to educate and inform the public in this sphere is an ideal means of making up for the shortcomings of the formal education system by providing environmental education for large sections of the population that have not yet received any schooling.

Objective: More effectively educating and informing the public about the environment through the use of the media and the new communication and information technologies.

Action 1: Producing media-related education programmes.

95. It is essential to produce media-related education programmes in order to develop in individuals a greater capacity to analyse and evaluate the nature, aims and purpose of the information put out by the media bearing directly or indirectly on the environment. After experimentation, these programmes should be systematically incorporated into all general education process relating to the environment, starting with primary education.

96. At the same time, any improvement in the quality of the messages concerning the environment that are carried by the media depends to a large extent on the relevant knowledge and awareness of professional communicators. There is a need to stimulate cooperation between scientists and environmental journalists. The best programmes or articles on environmental problems and their solutions come from an active cooperation between scientists and professional communicators. It is therefore a priority to incorporate an environmental dimension into training programmes for journalists, television and film directors, for people in advertising, specialists in information technology, etc., with a view to making environmental education generally available at the national level. One appropriate approach is to offer short interdisciplinary courses on environmental issues, either within the framework of their initial training programmes, or on an ad hoc basis for personnel in service.

Action 2: Use of new communication media and activity teaching methods.

97. It is urgent to develop more relevant, less expensive programmes to educate and inform the public. This presupposes that environment-related programmes meet various educational objectives (develop awareness, shape values, provide scientific and technical information, technical instruction, etc.), and be tailored to the needs and interests of various types of user. These programmes should make use of the interactive and iconographic possibilities offered by the new communication media (data processing, teleprocessing, video). For this purpose, priority should be given to those educational methods (such as environmental games and simulations) capable of reproducing complex situations resembling those encountered in real life.

98. Similarly, existing programmes for general and technical distance education aimed at certain socio-occupational groups, such as the radio programmes for farmers broadcast by Latin America, should be systematically reinforced by the addition of an environmental education component.

Action 3: Creation of a bank of audiovisual programmes.

99. The identification and utilization of mechanisms to facilitate the production and circulation of audiovisual (video and computer) environmental programmes make an appreciable contribution to the development of education in this sphere. To this end, steps should be taken in particular to set up a freely accessible bank of environmental programmes, consisting of audiovisual works in the public domain, or transferred to the international public domain by their authors (individuals and institutions). Further, information on available resources should be made widely available by means of regularly updated directories and data bases, disseminated through the IEEP network and the newsletter **Connect.**

Action 4: Development and use of exhibitions and museums.

100. Regional museums, museums of natural history and ecomuseums play a significant role in the systematic integration of new environmental data and experiences, presentation of visual and other materials, and education of the general public as well as teachers and students. Their educational role is heightened by organization of special exhibitions, lecture courses and excursions, emphasizing global, regional, national and local environmental conditions. Developing countries should be assisted in the creation or improvement of such museums through bilateral, regional and/or international cooperation including scientific and other exchanges.

Action 5: Developing Unesco-UNEP joint activities.

101. Personal contacts through local organizations are often more effective by directly influencing attitudes and actions than radio and TV. Thus, in educating the public it is not enough to depend on the mass media; one must also rely on the school system and NGOs, which form an infrastructure for continuing, permanent education. Joint action by Unesco and UNEP is specially appropriate in this connection.

102. In order to ensure cost-effective dissemination of environmental knowledge to the public, Unesco and UNEP could jointly and separately continue to interpret and present scientific information to journalists and other media personnel. Similarly, joint projects and special courses could be arranged between scientific institutions and the media. In this manner educational radio, TV and press programmes or articles could be improved at relatively low cost (as compared to the production of such programmes or articles by the UN agencies themselves).

G. General University Education.

Guideline for the strategy:

"Universities, as centres for research, teaching and training of qualified personnel for the nation, must be increasingly available to undertake research concerning environmental education and to train experts in formal and non-formal education. The environmental education... is necessary for students in all fields, not only natural and technical sciences but also social sciences and arts, because the relationship between nature, technology and society mark and determine the development of a society."

(Final Report, Tbilisi Conference, 1977, page 33)

103. The purpose of general university education given to students either before or during their specialized training is to enable them to find their bearings in the context of existing knowledge and current trends, and to heighten their awareness of the main problems facing the contemporary world.

104. Within this framework, general environmental education is taken to mean effectively-structured educational activities whose objectives and content relate to essential aspects of environmental issues.

105. The need to consider environmental concerns within the framework of general university education is now recognized by the institutions of higher education of a growing number of Member States. In many instances, it is considered that measures to familiarize students with the complex problems of the environment offer an ideal means of acquainting them with the various facets of reality, and subsequently fostering the interdisciplinary dialogue and work essential to effective environmental action.

106. Nevertheless, although environmental education at the general university level is rapidly gaining ground, it is developing very unevenly from one country to another. As yet, it is included only occasionally, if at all, in the curricula of most universities around the world, especially in developing countries. This gives some idea of the magnitude of the needs remaining to be met, and shows how important it is to regard action in this sphere as one of the priorities for the coming decade.

107. The main obstacles to be overcome derive, firstly, from the fact that teachers of various university subjects (natural and social sciences, philosophy, arts, etc.) are insufficiently receptive to the multidisciplinary and interdisciplinary outlook that an understanding of environment issues requires and, secondly, from the scarcity of environment – linked educational programmes designed for general university education. In the last analysis, these obstacles usually derive from the excessive compartmentalization of knowledge in universities.

108. It should be a high priority to bring women into environmental education and sciences at the university level.

Objective: More effective incorporation of the environmental dimension into general university education through the development of study programmes, teaching materials and training, and through the establishment of appropriate institutional machinery.

Action 1: Developing the awareness of academic authorities.

109. In order to intensify co-operation among specialists in various disciplines and among faculties, urgent measures should be taken by Unesco and UNEP in the fields of knowledge concerned by the environment, to make the authorities aware of the importance that environmental education should have in general university education, which may require reorganising the university system, and to familiarize them with the concepts, methods and means that are best suited to the development of this education. Short Seminars at the national or regional level might serve this purpose, often through cooperation with the interested university or academic organizations.

Action 2: Development of study programmes.

110. It is also urgent to devise study programmes, preferably in the form of integrated courses on environmental issues, for all students during their general education. To foster understanding of contemporary environmental issues, these courses should draw on the contributions of various academic disciplines in dealing with such questions as the design and application of self-reliant development models based on the rational use of natural resources and designed to preserve the biological diversity and aesthetic qualities of the environment. Textbooks and reference books should also be developed appropriate to each country with the assistance of UNEP and Unesco, if needed.

111. In carrying through these tasks, systematic use should be made of the social sciences with a view to highlighting the links between social systems and nature, and in particular the importance of socio-cultural factors in the genesis of present-day environmental problems. Lastly, traditional ecology as subject matter is to be noted.

Action 3: In-service teacher training

112. To speed up the incorporation of environmental education into general university-level education, efforts should be made to develop educational content and tools (teaching methods, information sources, modern communication media, etc.) so that in-service training for teachers in various traditional disciplines can be intensified by updating their knowledge of contemporary environmental problems, particularly in the national context. Interdisciplinarity and an environmental dimension should be incorporated into existing disciplines for higher teacher training.

Action 4: Institutional intra-university co-operation.

113. To ensure that, as scientific research advances, environmental education programmes for general university education are constantly brought up to date, efforts should be made to foster closer and more regular working relations between natural and social science research institutions and specialists in the educational sciences.

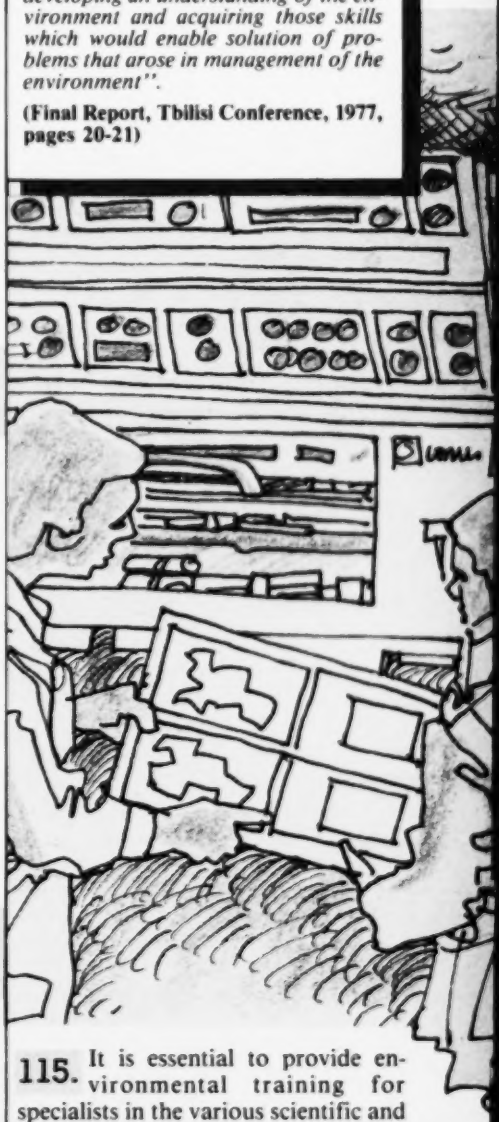
114. More systematic co-operation between the appropriate university authorities and the services that design curricula for other levels of the education system (primary, secondary, technical and vocational education, etc.) should also help to improve the relevance and functional character of the education provided.

H. Specialist Training

Guideline for the strategy:

"Education focused on the solution of specific problems was seen to be of particular relevance to professionals for developing an understanding of the environment and acquiring those skills which would enable solution of problems that arose in management of the environment".

(Final Report, Tbilisi Conference, 1977, pages 20-21)



115. It is essential to provide environmental training for specialists in the various scientific and technological disciplines, in order to ensure more rational, and hence more harmonious, interactions between social systems and the human environment, in the context of sustainable development. "Protection" of the en-

vironment means use of its resources in a sustainable manner, a guiding principle in the training and retraining of specialists.

116. Institutions of higher education in many countries have made great efforts to provide specialized environmental training, in particular by introducing international postgraduate courses supported by Unesco and UNEP and by other governmental and non-governmental agencies. However, these efforts are not enough and need to be stepped up in the future and supplemented by field training activities.

117. Realizing that many disciplines which are not directly concerned with the environment may nonetheless have major impact on the sustainable development of natural resources, UNEP, Unesco, other international agencies and non-governmental agencies should continue to seek ways and means to incorporate appropriate environmental elements in all professional and technical training courses (e.g. courses for engineers, architects, chemists, planners, economists, lawyers and technicians).

118. Specialized training programmes in the various disciplines concerned with the environment should be regarded as being of priority importance in promoting general awareness of the environmental problems connected with the future of humanity. This makes it necessary for specialists to be given training that lays emphasis on the interactions between development and the environment and thus enables them to understand the impact of human activities on the environment and to contribute effectively to the implementation of development programmes capable of maintaining a dynamic environmental balance. The object is to promote the concept of **sustainable development** able to meet present needs while preserving the quality and productive potential of the environment, and hence its capacity to meet the needs of future generations.

Objective: Promoting specialized scientific and technical environmental training.

Action 1: Initial training for environmental specialists.

119. Measures to bring about qualitative improvements in the training of specialists in disciplines concerned with the environment consist essentially in working permanently to strengthen existing programmes in higher education and in creating others at all levels. The competent national institutions in collaboration with specialized international bodies should make increased efforts, particularly in the developing countries, to train a sufficient number of high-level personnel to ensure sustainable development and economic growth. Students and professionals, both technical and managerial, responsible for ecologically-sound decisions, should have courses in environmental ethics, norms and values, learning about the underlying factors of the culture and life-style societies have chosen to adopt. This will teach the learner that environmental problems and their solutions are not solely of a technical but largely of a human nature, involving social, cultural, ethical and economic values.

120. The management of natural resources and land-use planning call for sustained attention both to the interrelations between the components and resources of the environment and to each resource considered individually. Measures should therefore be taken to strengthen the advanced interdisciplinary courses that provide specialists in the various disciplines with a better understanding of the complexity of environmental problems and encourage the application of integrated approaches to conceptualization and to the implementation of solutions. In this connection, there is a need to set up national centres for the training of those who make decisions concerning the rational management of the environment.

Action 2: Further training for professionals including decision-makers and administrators.

121. **In-service training for environmental** specialists, teachers and researchers is clearly a priority if the object is to have high-level personnel with an awareness of environmental problems. The sites of UNEP programmes (OAC/PAC, GEMS, Desertification Control, EMS, etc.) and those of Unesco's intergovernmental programmes (MAB, IHP, IGCP) provide natural settings for the further training of such specialists. These programmes, together with the competent international, governmental and non-governmental organizations, should intensify their action to introduce at the national and subregional levels courses of further training aimed at practical, on-the-spot action which will enhance the relationship between local people and the resources upon which they depend. In this respect, education and training programmes should be extended to senior decision-makers and administrators involved in land-use and project plans. Retraining of specialists in a definite branch of economy should be envisaged formally. Such retraining is especially suitable for industrial managers and specialists. At the various levels of decision-making advanced impact assessment procedures should be applied. Thus the subject of Environmental Impact Assessment (EIA) should be viewed as an element of specialized environmental training.

Action 3: Training through research

122. Existing fellowship programmes should be evaluated and strengthened so that advanced training, in the form of participation in specialized research, can be offered to researchers in the places where UNEP's and Unesco's environmental programmes are being carried out, for instance: research vessels and oceanographic laboratories for IOG; pilot projects and biosphere reserves for MAB; specific activities within the framework of the major regional projects concerning the earth, water and marine sciences; regional and national projects within the framework of GEMS, IRPTC, Earthwatch, Environmental Management Services, Desertification Control or ZACPLAN of UNEP. Above all, information about legislative and managerial (administrative) activities involving environmental policies in different social systems should be analysed and disseminated throughout the world, including the state of the art of environmental decision-making in market, planned and mixed economies. Lastly, international summer courses for teachers in natural parks, biosphere reserves, etc., should be conducted regularly.

Action 4: Development of suitable study programmes.

123. There is need to develop "environmental economics" to in-

tegrate the ecological and cultural basis of sustainable development into theories and instruments of economics, as well as to develop indicators and data on the quality of life and the environment, indicators on the ecological potential for sustainable development, and different strategies for the integrated management of resources.

124. In the qualitative and quantitative improvement of environmental training for specialists, specialized international institutions and bodies such as UNEP, Unesco, UNIDO and ILO can play an important role by promoting exchanges of information concerning the programmes being carried out in various countries and exchanges of specialists between institutions and between countries with different degrees of experiences with a view to developing appropriate training programmes.

125. In addition, Unesco's intergovernmental scientific programmes (IHP, COMAR, MAB, etc.) and UNEP's international and regional programmes (OCA, GEMS, Desertification, etc.) could provide information for the drawing up of study programmes, particularly at university level and in the area of technical education. To enhance the development of interdisciplinary environmental programmes, Unesco and UNEP should support the establishment of multiple relationships between long-established environmental institutes, programmes, centres, and emerging institutes, programmes and centres.

Action 5: Use of natural parks, biosphere reserves and other protected areas.

126. Immediate actions involving environmental education and training to be taken in natural parks, biosphere reserves and other protected areas are the following: (a) explanation of the concepts of these areas to local people in their language; (b) development of materials and programmes to fully explore the potential of visitor centres or other logistical facilities available in most protected areas for environmental education and training (EE and T); (c) establishment for each protected area of an advisory body for the implementation of such programmes as the Action Plan on biosphere reserves, including EE and T; (d) setting up of training curricula for protected area managers and incorporation of them into conservation training courses; (e) conduct of a detailed international survey on EE and T in protected areas as a basis for more effective interaction among these protected areas; this would involve evaluation of the effectiveness of ongoing EE and T programmes in these areas; and (f) establishment of special programmes and ecomuseums in protected areas for the preservation of traditional cultures, life-styles and resource use.

Action 6: Strengthening regional training capacity.

127. The strengthening and development of regional networks of research and training institutions would be an effective means of identifying, among the institutions existing in the various regions, centres of excellence capable of introducing environmental training programmes in each region. UNEP should provide continued support so as to help strengthen the environmental training capability of the regions.

I. International and Regional Co-operation.

Guideline for the strategy:

"Both the developing and the industrialized countries should benefit from increased international co-operation in environmental education... This education should help to develop a sense of responsibility and solidarity among countries and regions as the foundation for a new international order which will guarantee the conservation and improvement of the environment. Environmental education can become one of the factors in improving mutual understanding and strengthening trust between nations, and can contribute to the development of friendly relations between States and to the maintenance of peace and international security."

(Final Report, Tbilisi Conference, 1977, pages 25; 39)

128. Since the Tbilisi Conference, efforts by Unesco, UNEP, international organizations such as IUCN and Member States, have shown that environmental education is an excellent means of improving the relevance of education in general and of enhancing its contribution to the search for and implementation of effective solutions to environmental problems, solutions which themselves help to improve living conditions.

129. The conceptual and institutional changes entailed by environmental education suggest that the 1990s will witness the gradual spread of this type of education throughout national education systems. In these circumstances, continuing international co-operation is an important factor in promoting the dissemination of information, thinking and research, and in providing technical support for innovative ventures by Member States in respect of environmental education and the training of teachers and technicians in the field.

130. Experience gained by the international community in the field of EE over the past ten years, and the needs expressed by Member States, have shown that the development of this type of education ought to be viewed in terms of an integrated strategy, drawing on the various components of the educational process (information, research, educational programmes and materials, training, etc.)

131. In the light of the foregoing, international co-operation should take the following as a general framework for future action in respect of environmental education: (a) the formal education system; (b) general and specialized higher education; (c) technical and vocational education; (d) out-of-school education for youth and adults in rural and urban areas, and public information and education programmes in general.

132. Within this general framework, certain specific areas for international co-operation should be regarded as having priority for the implementation of a coherent strategy with respect to EE and T.

Objective: Development of environmental education through co-ordinated international and regional co-operation.

Action 1: Exchange of information.

133. To foster a rapid international flow of information on environmental education and facilitate closer contacts between competent governmental and non-governmental institutions, an **international system**, making use of the new communication technologies, should be used to collect, process and disseminate information. For this purpose, measures should also be taken to **strengthen** the activities of the UNEP regional training networks of institutions of excellence, and the regional documentation units serving the Unesco and UNEP Regional Offices. Additionally, every effort should be made to revise, update and publish periodically environmental directories and glossaries.

134. Similarly, Unesco, UNEP, IMO, FAO, IAEA, IUCN and other organizations dealing with the environment should co-ordinate their efforts in the field of EE information; in particular, they should ensure the compatibility of future computerized data bases.

Action 2: Promotion of research and experimentation.

135. The aim here is to promote research and experimental projects with a view to developing new content, educational methods and communication systems; to foster wide and more systematic dissemination of the results thus achieved by the international community as a whole; and to facilitate their adaptation to each country's specific socio-economic and cultural conditions, and to its specific environmental situation.

136. It is urgent, in this respect, to carry out research to define the functions that the various social sciences are capable of performing, with a view to better understanding present-day environmental problems and thus introducing, at all levels of education, more socially relevant and functional environmental education programmes.

137. Within the framework of efforts being made at the international and national levels, it would be desirable for IEEP to conduct a world survey on the objectives of environmental education in Member States and on the strategies adopted by them with respect to education and training. This survey would provide a basis for more specific research activities and experiments aimed at improving methods of programming educational processes and evaluating the results obtained.

138. Unesco should commission a group of scientists and scholars to produce models of interdisciplinarity which may be applied to environmental education, training and research. Pilot projects should be developed in one or two identified institutions (centres of excellence in selected areas of the world) to test these models and provide examples which are thereotically sound of interdisciplinary teaching/training and EE research.

Action 3: Promoting training.

139. International co-operation, with the support of Unesco and UNEP, could help to promote national training programmes by providing Member States, at their request, with appropriate technical assistance and by supplying them with information, model curriculum guidelines and teaching materials. This could be achieved by means of pilot training projects, courses, etc., organized by national institutions in co-operation with international, regional and sub-regional bodies.

Action 4: Study programmes.

140. Associating itself with the efforts made by Member States to develop study programmes and teaching materials incorporating the environmental dimension, IEEP will continue to prepare model curriculum guidelines and programmes for the different levels and kinds of education, taking care to ensure the relevance and consistency of the different approaches, and to co-ordinate its efforts with interested governmental institutions.

Action 5: Information on legislation concerning environmental education, natural resources and environmental management.

141. To assist Member States in their efforts to incorporate environmental concerns into their educational policy-making and planning, it would be worthwhile undertaking a number of case and comparative studies of the legislation concerning environmental education in various countries, and on the institutional machinery established in this regard. Similarly, in order to assist Member States in strengthening their framework of environmental law, comparative studies of laws relating to natural resources and environmental management should be undertaken. The information resulting from these studies should be widely circulated through existing networks and information systems.

Action 6: Regional action within the framework of IEEP

142. Special action is envisaged for international assistance in developing national strategies for EE and T. In this connection, Member States will be assisted in the planning and implementation of their national actions in EE and T in the name of more effective regional and international cooperation.

143. In order to facilitate the adaptation to local conditions of action undertaken within the framework of IEEP, as well as to improve co-ordination and increase the impact of such action at the regional level, regional advisors (EE specialists) for

IEEP should be provided; while located in the UNESCO's Regional Offices these advisors should work in close co-operation with the UNEP's Regional Offices. With the same ends in view, machinery should be established to ensure sustained, effective co-operation between Unesco's Regional Offices and those of UNEP.

144. Furthermore, to promote the decentralization of essentially regional activities, especially in regard to the training of personnel and the adaptation of teaching materials, increased financial resources should be allocated for IEEP's regional activities.

Action 7: Mobilization of technical and financial resources.

145. In order to respond to the growing demand for environmental education throughout the world, it is essential that a greater proportion of the technical resources available at the international, regional and national levels be mobilized, by associating competent governmental and non-governmental organizations more closely with international co-operation in this sphere.

146. With the same ends in view, Unesco and UNEP should actively seek out new sources of funding, both international and national, public and private, in order to facilitate the extension of IEEP activities.

Action 8: Inter-agency co-ordination and consultation at the international level.

147. The implementation of an international strategy for environmental education and training for the 1990s calls for inter-agency co-ordination and mobilization on a broader scale. To this end, priority should be assigned to strengthening, within the framework of the "System-wide medium-term environmental programme" (SWMTEP-II, 1990-1995), the machinery for co-ordination and cooperation among the Specialized Agencies of the United Nations concerned with the environment.

148. There is also a need, in order to make better use of the research findings of Unesco's intergovernmental programmes, in particular MAB, the International Geological Correlation Programmes (IGCP), the International Oceanographic Commission (IOC), the UNEP's specialised Programmes and the International Hydrological Programme (IHP), to stengthen cooperation between IEEP and these programmes as part of concerted action to develop environmental education and training.

Action 9: World Decade for Environmental Education, 1990-2000

149. Taking account of the fact that worldwide development of environmental education is a lengthy and complex process, and the need for advance planning, it is desirable to designate 1990-2000 as a **"World Decade for Environmental Education"**. Programmes developed for this decade should emphasize interrelationships between people and the biosphere in their full range of economic, social, political, cultural and ecological manifestations. It is suggested that Unesco and UNEP be designated as the leading agencies for programme planning and coordination and developing criteria for evaluation of progress.

Action 10: International congress on EE and T for the beginning of the twenty-first century.

150. In view of the fact that the worldwide development of EE and T is a lengthy process, and that educational, environmental and development problems are bound to change during the coming decade, it is envisaged to hold another international congress on EE and T in 1997 to take stock of the progress achieved and to draw up, in the light of needs, priorities and means, an EE and T plan of action for the first decade of the twenty-first century.

Published jointly by the United Nations Educational, Scientific and Cultural Organization, 7, place de Fontenoy, 75700 Paris, France and
the United Nations Environment Programme, P.O. Box 30552 Nairobi, Kenya.

Designed by
Philip Galley & Michael Atchia.
Produced by Nairobi Creative Associates Ltd.

Printed by
Majestic Printing Works Ltd.,
Nairobi, Kenya.